Message

From: Davis, Eva [Davis.Eva@epa.gov]
Sent: 10/22/2019 7:05:02 PM
To: Jennings, Eleanor [Eleanor.Jennings@parsons.com]; Steven Willis [steve@uxopro.com]; D'Almeida, Carolyn [dAlmeida.Carolyn@epa.gov]; 'Brasaemle, Karla' [KBrasaemle@TechLawInc.com]; Wayne Miller [miller.wayne@azdeq.gov]
CC: Dan Pope [DPope@css-inc.com]
Subject: RE: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

Thanks for the rundown – I can get a little lost when the discussion is real heavy on the microbiology stuff. We didn't say, the data you have now does not demonstrate enhanced biodegradation, but the discussion was on obtaining even better data.

Eva

From: Jennings, Eleanor <Eleanor.Jennings@parsons.com>
Sent: Tuesday, October 22, 2019 10:28 AM
To: Davis, Eva <Davis.Eva@epa.gov>; Steven Willis <steve@uxopro.com>; D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller <miller.wayne@azdeq.gov>
Cc: Dan Pope <DPope@css-inc.com>
Subject: RE: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

Sensitive

Good morning, Team
Sorry for the delayed response – I was down in the Washington DC office for meetings yesterday.

You bring up a good point, Eva, and actually we did discus most of the items. We went over some of the plans for the upcoming SRB-BART testing, and the importance of seeing more than one data point per well in order to see trends of maintaining significant SRB populations (the third bullet on the below list). We also started discussing the upcoming stable-isotope-benzene BioTraps, and how some (but not all) deployments should start by the end of this calendar year. They will have a variable length of deployment times, being pulled out at either 30, 60, or 90 days after deployment. That matches the fourth bullet point, as the "in the field" qualitative SRB BART tests are fine for inexpensive field monitoring, but the truly valid data will come from the stable-isotope tests because this will be the only way to truly quantify population sizes and confirm benzene bioattenuation.

The first and second bullet starts getting into the previously conducted BioTrap tests. If you remember, the earlier BioTraps were used to collect indigenous microbes (including SRBs) from the groundwater for quantified population counts. However, unlike the upcoming round, the BioTraps discussed below did NOT include the incorporation of the stable-isotope-baited benzene component and so there was no confirmation or quantification of benzene bioattenuation.

For the first bullet, I had reviewed all of the previous microbial data in prep for the call. However, the first bullet involves the earlier, molecularly quantified SRB population. Until the stable-isotope-baited-BioTraps are run at the end of this year, we won't have comparable SRB population data and thus I chose to not say anything further once it was revealed that the BioTraps were being scheduled. Part of this decision was because it's very hard to compare the very subjective, qualitative SRB BART data to the very quantitative data that the BioTraps produce. There are so many variables that go into how to interpret the SRB BART tests … it's why the manufacture openly says that these are only general ballpark order-of-magnitude-at-best assessment. For inexpensive and fast field monitoring, it's a totally valid

method. But the "real" data will come with the BioTraps. Trust me, that data comparison will be something I am very looking forward to doing once the 2019-2020 Biotrap data comes in. But I was just happy to finally hear that they ARE being planned, that they WILL include the stable-isotope-labeled-benzene component, and that there is a timeline – that's much further along than where we've been up to this point.

Finally, we touched on the second bullet, but whereas the second bullet involves the quantified molecular SRB assessments that took place as part of the BioTrap sampling, we discussed the need to see higher population sizes maintained via monitoring with the qualified SRB BART tests. However, the same approach still carries for the quantified data produced by the BioTraps and I am very much looking forward to that data. I'm not holding my breath, but it would be nice if we saw a workplan for the upcoming stable-isotope-baited-Biotraps before they get deployed. Specifically, what monitoring wells they will be put into. Remember that once these BioTraps get deployed, they can't be moved. In an ideal world, you would want to put them back into the same wells targeted earlier when the non-stable-isotope-benzene-BioTraps were used. No, these earlier BioTraps didn't include the labeled benzene component, but they did involve molecular quantification of the SRB population. Thus, if we had the upcoming Biotraps being deployed to those same MWs, it will be a clear apples-to-apples comparison. If I had to guess, though, this won't happen. But it would still be nice to know in advance where they plan to do those deployments so we can discuss the implications of the locations, if there are maybe better alternative locations, etc. Just my thoughts on that topic.

Anyhow, Eva, you were totally correct in looking back at this email and these bullet points – I was right there with you doing the same thing before the call! And we did mostly discuss them, just in round-about ways. Those specific items that I chose not to bring up – I didn't forget, Don was just getting a little testy when I was trying to discuss the microbiology analyses and I decided not to keep stirring the pot with discussions on data that hasn't been sampled for yet. I'll save the boxing gloves for when I really need them... ☺

Let me know if you have any questions or would like to discuss anything further.
Cheers!
E

Eleanor M. Jennings, M.S., PhD
Project Principal Scientist - Environmental Microbiology and Biogeochemistry
Eleanor.Jennings@Parsons.com
202.302.9996

"Safety Isn't Expensive. It's Priceless."

From: Davis, Eva <Davis.Eva@epa.gov>
Sent: Monday, October 21, 2019 3:31 PM
To: Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Steven Willis <steve@uxopro.com>; D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller <miller.wayne@azdeq.gov>
Cc: Dan Pope <DPope@css-inc.com>
Subject: [EXTERNAL] RE: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

It occurred to me during last week's call that maybe we should have been discussing these results with them??

From: Jennings, Eleanor <Eleanor.Jennings@parsons.com>
Sent: Friday, September 27, 2019 3:29 PM
To: Davis, Eva <Davis.Eva@epa.gov>; Steven Willis <steve@uxopro.com>; D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller

<miller.wayne@azdeq.gov>
Cc: Dan Pope <DPope@css-inc.com>
Subject: RE: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

Sensitive / Proprietary

Hello again, Team!

Eva – as a National Chair for the American Society for Microbiology, I invite you to become a member! You did a great job evaluating the data!

A few more thoughts on my end:

- When present, SRB population sizes are approximated at 10e4, with one exception (LSZ 38, which had a single measurement of 10e5. You really want to see 10e6 at the bare minimum, but closer to 10e7 to 10e8 for true enhanced bioremediation from amendments.
- At the 6/28/18 BCT call, data presented included that for quantitative molecular qPCR results for SRBs. This data reported counts ranging from ND (in three of the six tested MWs) to 10e4-10e6 for the remaining three wells that had detectable population sizes. Although the MWs tested for this quantitative analyses are different from those currently being monitored by the SRB-BART test, I would like to see population estimates higher than this apparent background population size. If sulfate is stimulating the SRB community, the population should grow in size.
- I would like to see more data points for the SRB-BART tests, for any given MW. Once they shut off an extraction well, I would like to see more than one data point. I would really like to see data month after month, to confirm the test results and to see if the approximated population sizes are being maintained. Better yet, these population sizes should increase over time as sulfate is consumed along with the benzene, in theory.
- The SRB-BART tests are a good, "back of the truck" monitoring method, but absolute confirmation of sulfate-reduction stimulating benzene biodegradation will come when the isotopically-labeled benzene-baited BioTrap in-situ sampler tests are run.

Happy Friday, everyone, and have a great weekend!
Eleanor

Eleanor M. Jennings, M.S., PhD
Project Principal Scientist - Environmental Microbiology and Biogeochemistry
Eleanor.Jennings@Parsons.com
202.302.9996

"Safety Isn't Expensive. It's Priceless."

From: Davis, Eva <Davis.Eva@epa.gov>
Sent: Friday, September 27, 2019 10:41 AM
To: Steven Willis <steve@uxopro.com>; D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller <miller.wayne@azdeq.gov>
Cc: Dan Pope <DPope@css-inc.com>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>
Subject: [EXTERNAL] RE: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

So I'm going to pretend I'm an amateur microbiologist and take a stab at interpreting this data:

For UWBZ26, no sign of BTEX degradation going on, and only a small number of sulfate reducing bacteria (SRB) found by the BART test.

UWBZ27 (since there is no UWBZ227, I assume they mean UWBZ27) – 76% or so of the SRB were killed off between 4/29/2019 and 6/17/2019, however, looking at the ratios of B to TEXN, and comparing them to the ratios seen in UWBZ26, there may be some TEXN degradation going on. B does not appear to be degrading (at least at this time).

LSZ23 – no SRB, but again the ratios may indicate TEXN degradation. If there is TEXN degradation going on in this area, it's not by SRB.

LSZ38 – better population of SRB, but still does not meet 'robust' criteria of 10E6+. B:TEXN ratios may indicate TEXN degradation, but not clear that B concentration is decreasing significantly. Lab data not available to determine if sulfate is being consumed.

LSZ39 – SRB population grew by more than an order of magnitude, sulfate may be being used, T concentration changes may show that it is being degraded.

How did I do?

From: Steven Willis <steve@uxopro.com>
Sent: Thursday, September 26, 2019 4:45 PM
To: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller <miller.wayne@azdeq.gov>
Subject: Re: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

Since this is similar to a colorimetric test, the results are semi-quantitative and somewhat subjective. I think Eleanor asked that they take photos of the BART bottles so we could have a better idea of what they look like when a determination is being made.

Steven A. Willis, RG

UXO Pro, Inc.

steve@uxopro.com

480-316-3373

From: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>
Sent: Thursday, September 26, 2019 1:11 PM
To: Steven Willis <steve@uxopro.com>; Davis, Eva <Davis.Eva@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller <miller.wayne@azdeq.gov>
Subject: RE: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

Thanks Steve

So, curiously the repeating SRB result of 27,000 is presumably qualitative result? How is the number derived?

Carolyn d'Almeida
Remedial Project Manager
Federal Facilities Branch (SFD 8-1)
US EPA Region 9 Laboratory
1337 South 46th Street, Building 201
Richmond, CA 94804
(415) 972-3150

"We can evade reality, but we cannot evade the consequences of evading reality." - Ayn Rand

---

From: Steven Willis <steve@uxopro.com>
Sent: Thursday, September 26, 2019 12:56 PM
To: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller <miller.wayne@azdeq.gov>
Subject: Re: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

Here you go

Steven A. Willis, RG

UXO Pro, Inc.

steve@uxopro.com

480-316-3373

From: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>
Sent: Thursday, September 26, 2019 12:54 PM
To: Davis, Eva <Davis.Eva@epa.gov>; 'Brasaemle, Karla' <KBrasaemle@TechLawInc.com>; Wayne Miller <miller.wayne@azdeq.gov>; Steven Willis <steve@uxopro.com>
Subject: FW: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

Did anyone download this? If so can you send me a copy? thanks

Carolyn d'Almeida
Remedial Project Manager
Federal Facilities Branch (SFD 8-1)
US EPA Region 9 Laboratory
1337 South 46th Street, Building 201
Richmond, CA 94804
(415) 972-3150

"We can evade reality, but we cannot evade the consequences of evading reality." - Ayn Rand

---

From: sharepoint@woodplc.com <sharepoint@woodplc.com>
Sent: Tuesday, September 24, 2019 1:17 PM
To: D'Almeida, Carolyn <dAlmeida.Carolyn@epa.gov>

Subject: Performance Based Remediation - Document Exchange: Regulatory ST012 (USEPA - ADEQ) Entry: Preliminary ST012 BART Test Summary

You are being notified of a Document Exchange File addition or modification: Preliminary ST012 BART Test Summary Data.pdf

Please click here [amext.amec.com] to view the file.
Please click here [amext.amec.com] to open the folder.

Title: Preliminary ST012 BART Test Summary
Doc Exchange: Regulatory ST012 (USEPA - ADEQ)
Comments:
Preliminary BART test and supporting data

File Posted By: Pearson, Stuart C.

Unsubscribe Notice:

You are receiving these notifications because of your access to this site. If you no longer wish to receive these communications and do not require access to this site please forward this email to one of the following Site Owner(s): naburi19@in.ibm.com; yvette.bojorquez2@amecfw.com; elyse.nardick@amecfw.com; angie.salaiz@amecfw.com with "Unsubscribe" in the subject line and your access will be revoked and notifications will be discontinued.
